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At the meeting held June 1, 1897, Dr. R. M. Pearce presented a

"BACTERIOLOGICAL REPORT OF 121 CASES OF ACUTE LOBAR PNEUMONIA, AND OF 128 CASES OF ACUTE BRONCHO PNEUMONIA ; TOGETHER WITH 55 CASES OF VARIOUS INFECTIONS DUE TO THE PNEUMOCOCCUS."

(An abstract of a paper which is to be published in the BOSTON MEDICAL AND SURGICAL JOURNAL.)

A report of all the cases of acute lobar pneumonia and acute broncho-pneumonia which have come to autopsy and have been studied bacteriologically at the Boston City Hospital between May 1st of 1894 and May 1st of 1897. It includes also the report of various infections due to the pneumococcus found at autopsy or at operation.

The work has been carried on under the direction of Prof. W. T. Councilman, in the Pathological Laboratory of the Boston City Hospital.

The methods of study pursued were those usually employed. Loffler's blood-serum prepared according to Mallory's modification, was the culture medium used. Cultures were taken from the solidified lung, pleural and pericardial exudates, if present, and heart's blood, liver, spleen, kidney, and various lymphatic glands. In some cases direct examination by cover-slip preparations was made.

In 121 cases of acute lobar pneumonia the pneumo-coccus was found in the solidified lung in 110 cases, in 84 of which it was the only micro-organism present. In the remaining 26 cases it was associated with the staphylococcus pyogenes aureus 9 times, streptococcus pyogenes 8 times, staphylococcus pyogenes aureus and streptococcus 3 times, streptococcus pyogenes and staphylococcus pyogenes albus twice, bacillus capsu-latus (Wright) once, staphylococcus pyogenes albus once, Klebs-Loffler bacillus once, both Klebs-Loffler bacillus and streptococcus pyogenes once.

(In this summary the presence of the bacillus coli-communis has not been considered of sufficient import-ance for classification).

Of the 11 remaining cases, in 8 the lung culture was not taken in 4, lost in 2, and sterile in 2, but in each of these there was a general infection with the pneumococcus, and in 3 it was present in either peri-cardial or pleural exudate. This would justify the conclusion that the process in the lung was due to the

same organism and was the source of the general infection. If therefore these cases are added to the others they make a total of 118 out of 121, or 97.5 per cent. due to the pneumococcus.

With the exception of the 8 cases just considered, in only 3 cases of the 121 was the pneumococcus not present in the solidified lung or pleural exudate. These cases both macroscopically and microscopically were true lobar pneumonias. In one case there was a general staphylococcus infection following epididymitis, cystitis and pyelo-nephritis. Cultures from lung showed abundant growth of staphylococcus pyogenes aureus. In the second case, complicating typhoid fever, lung cultures showed abundant growth of the streptococcus pyogenes. It is very probable that in both these cases the growth of the pneumococcus was inhibited, or was present in small numbers but obscured by the profuse growth of the other organism. The third case was an old pneumonia, well along in the third stage, in which the staphylococcus pyogenes albus only was found. It is very probable that in this case the pneumococcus was the causative agent, but had died out.

In this series the bacillus of Friedlander was not met with at all.

COMPLICATIONS.

In the exudate of acute pleuritis and acute pericarditis associated with pneumonia, the pneumococcus was

found in every case in which examinations were made, 49 times in pleural exudates and 15 times in pericardial exudates.

Abscess of lung following pneumonia occurred in three cases. In two of these the pneumococcus was the only organism present. In the third case, which was an unresolved pneumonia, the staphylococcus pyogenes aureus and the streptococcus were also present in addition to the pneumococcus.

In 2 cases in which an acute meningitis, and in 3 in which an acute endocarditis was associated with or followed the pneumonia, the pneumococcus was present in pure culture. This was also true of one case of acute fibrinous peritonitis.

As regards general infection, in this series of 118 cases, the pneumococcus was found in the heart's blood 56 times, liver 44 times, spleen 47 times, kidney 51 times, and in 2 cases in which the exudate extended up through the mediastinal tissues to the neck, the pneumococcus was present in the infiltrated tissues and cervical glands.

As regards the intensity of the infection, in 18 cases it was found in all of the organs, that is heart's blood, liver, spleen, and kidney; in 18 cases in three, in 21 cases in two, and in 24 cases in at least one.

The results in this series agree with those of Frankel, Weichselbaum, Netter, Welch, and others; though the proportion of cases in which the pneumococcus

was found is greater, as is also the number of cases with general infection.

ACUTE BRONCHO-PNEUMONIA.

This report includes 128 cases, which may be divided into two classes, those associated with the acute infectious diseases of childhood, 82 cases ; and second, those associated with other medical and surgical affections and generally occuring in adults, 46 cases.

Of this first class 62 were associated with diphtheria alone and the organisms present were the Klebs-Loffler bacillus 52 times, the streptococcus pyogenes 27 times, the staphylococcus pyogenes aureus 11 times, the staphylococcus pyogenes albus once, and the pneumococcus once. The Klebs-Loffler bacillus occurred alone in 17 cases, the streptococcus pyogenes alone in 7 cases. In the rest of the 62 cases the organisms occurred in various combinations.

In 9 cases of scarlet fever and diphtheria combined, the Klebs-Loffler bacillus was present in every case, in 5 cases alone, in the other 4 associated with the streptococcus pyogenes, the staphylococcus pyogenes aureus, and the pneumococcus.

In 2 cases of diphtheria and measles combined, the Klebs-Loffler bacillus, the streptococcus and the staphylococcus pyogenes aureus were present in each case.

In 9 cases of scarlet fever the streptococcus was found in two cases, the pneumococcus in two cases, the staphylococcus pyogenes aureus in one case, the streptococcus pyogenes and staphylococcus pyogenes aureus in 3 cases, the pneumococcus and the staphylococcus pyogenes aureus in 1 case.

The association of the Klebs-Loffler bacillus with broncho-pneumonia in such a large proportion of the cases, 63 out of 73, would indicate that its presence was more than accidental; and its occurrence in pure culture in 17 cases strengthens the theory held by some observers, that broncho-pneumonia may be due to the action of this organism, with or without the aid of the pyogenic cocci.

Of other organisms associated with the broncho-pneumonia of diphtheria and scarlet fever the strepto-coccus pyogenes is the most common. In this series of 82 cases it occurred 44 times. The pneumococcus was present in only 8 cases, and it is of interest that 5 of these were scarlet fever cases. In 2 of the latter it was obtained in pure culture.

The second class of broncho-pneumonias, 46 in number, occurring principally in adults, are best studied by grouping them according to the diseases with which they are associated, as follows: typhoid fever, 5 cases, the colon bacillus in 2, the pneumo-coccus in 1, and the pneumococcus, streptococcus, pyogenes and staphylococcus pyogenes aureus in 1.

In the 5th, which was also complicated by diphtheria, the Klebs-Loffler bacillus, staphylococcus pyogenes and bacillus capsulatus were found.

Chronic purulent bronchitis, 4 cases, in 2 the streptococcus pyogenes alone; the pneumococcus in one and the staphylococcus pyogenes aureus in one.

Gangrene of lung, one case, colon bacillus only.

Chronic pulmonary tuberculosis, (with an associated non-tubercular broncho-pneumonia), 3 cases, in one the pneumococcus; in another the staphylococcus pyogenes aureus; and in the third the streptococcus pyogenes and staphylococcus pyogenes aureus together.

Acute miliary tuberculosis, 1 case, streptococcus pyogenes, general streptococcus infection.

Pulmonary thrombosis, 2 cases, pneumococcus in one; colon bacillus in the other.

Acute meningitis, 4 cases, in each the same organism was found in the broncho-pneumonia as in the meningeal exudate, in three the streptococcus pyogenes, in one the pneumococcus.

Acute nephritis, 1 case, the streptococcus pyogenes and the pneumococcus. General infection.

Chronic cardiac and renal, 6 cases, in three the pneumococcus alone, with general infection. The streptococcus alone in 2 cases; and the staphylococcus pyogenes aureus in 1 case.

Chronic nephritis, 2 cases, in one the pneumococcus and the staphylococcus pyogenes aureus; and in the other the pneumococcus and the streptococcus.

Acute ulcerative endocarditis, 2 cases, the strepto-coccus in one, the pneumococcus in the other.

Intestinal affections, 4 cases, in three of these, (diphtheritic colitis, chronic colitis and appendicitis, respectively,) the process in the lung was due to the streptococcus pyogenes. In the 4th., acute intussus-ception, the streptococcus pyogenes and the pneumo-coccus were present.

Acute peritonitis, 1 case, colon bacillus the only organism present.

Cerebral hæmorrhage or thrombosis, 3 cases, the pneumococcus, alone in two, the staphylococcus pyo-genes albus in the third.

Multiple injuries with cerebral hæmorrhage, 1 case, the streptococcus pyogenes.

Acute suppurative inflammation of the middle ear, 2 cases, the streptococcus pyogenes alone in one, the streptococcus, pneumococcus and staphylococcus pyo-genes aureus in the other.

Puerperal septicæmia, 1 case, the streptococcus pyo-genes.

To sum up, the streptococcus pyogenes occurred alone in 16 cases, the pneumococcus alone in 12 cases, the staphylococcus pyogenes aureus alone in 6 cases, the staphylococcus pyogenes albus alone in one case, the colon bacillus in five cases, and the various combina-tions of these in the other cases.

It is noticeable that in all cases where a local or a general infection existed the associated broncho-pneu-

monia was due to the same micro-organism. But where the condition was a chronic or non-infectious process, as chronic cardiac and renal diseases, cerebral hæmorrhages, etc., the broncho-pneumonia was generally due to the pneumococcus; thus, of the twelve cases in which the pneumococcus occurred alone, eight were chronic diseases.

III.

Various infections due to the pneumococcus, fifty-five cases.

The autopsy records show 26 acute infectious processes in which the pneumococcus was present, and which were not accompanied or preceded by a lobar pneumonia. These are divided as follows: acute ulcerative endocarditis, 6 cases; two cases were associated with chronic pulmonary tuberculosis, one with a broncho-pneumonia and one with an abscess of the myocardium; and in two there were no lesions besides the endocarditis. In all, the pneumococcus was the only organism present. In three cases there was a general infection.

Acute purulent meningitis, five cases. Two of these followed suppurative disease of the middle ear due to infection through the Eustachian tube after fracture of the base of the skull through the petrous portion of temporal bone. (These two cases have already been reported by Wright and Stokes in Boston Medical and

Surgical Journal, March, 1895). Pure culture of the pneumococcus was obtained in each case ; and a general infection was present in each case. The third case was a broncho-pneumonia, pneumococcus was obtained in pure culture. The two other cases were apparently primary infections. The pneumococcus occured alone in one, and in the other was associated with the streptococcus pyogenes and the diplococcus intracellularis meningitidis.

Acute fibrinous pericarditis, 3 cases. The pneumococcus was obtained in pure culture in each case.

Acute fibrinous peritonitis, six cases. One followed operation for radical cure of inguinal hernia ; the pneumococcus present in pure culture ; general infection. Two cases followed an acute endometritis, the pneumococcus present in pure culture, and also demonstrated in the endometrium and Fallopian tubes ; general infection in both cases. One case followed rupture of pyo-salpinx, the pneumococcus present in pure culture. One case followed perforation of rectum with formation of pelvic abscess, colon bacillus and staphylococcus citreus present in addition to the pneumococcus. In the 6th case following appendicitis, there was a profuse growth of the pneumococcus with a few colonies of staphylococcus pyogenes aureus.

There was general infection with the pneumococcus in 6 cases. In three cases associated with leukæmia, chronic pulmonary tuberculosis, and general sarcoma-

tosis (with broncho-pneumonia) respectively, the pneumococcus was present in pure culture. (This last case has been previously reported by Dr. Wright.) In the remaining 3 cases it was associated with the staphylococcus pyogenes aureus.

In the Surgical and Medical Reports of the hospital, infection with the pneumococcus has been found 29 times. These infections are divided as follows : Pleuritis, 15 cases, in 7 of which the exudate was sero-fibrinous and the pneumococcus present in pure culture. In 8 cases of purulent pleuritis the pneumococcus was present in pure culture in 6 and associated with the streptococcus pyogenes in 2. These cases were, of course, all coincident with acute lobar pneumonia.

Acute abscess, 6 cases. In four of these the pneumococcus was present in pure culture. They were deep cervical abscess, abscess of leg, of upper eyelid, and of liver communicating with pleural cavity, respectively. In the other two, of the face and finger respectively, one had the staphylococcus pyogenes aureus present ; and the other the streptococcus pyogenes in addition to the pneumococcus.

Acute suppurative otitis media, 2 cases. Pneumococcus alone in one ; in the other associated with staphylococcus pyogenes aureus.

Acute suppurative mastoiditis, 3 cases. The pneumococcus alone in one, associated with the streptococcus pyogenes in the other.

Acute purulent peritonitis, 1 case, pneumococcus and colon bacillus present.

Gangrene appendicitis, 1 case, pneumococcus and colon bacillus present.

Pyo-salpinx, 1 case, pneumococcus present in pure culture.

The association of the pneumococcus with the above acute processes indicates that like the tubercle bacillus and the typhoid bacillus, it may in addition to its specific characteristic lesion, produce acute suppuration.

Dr. J. B. Blake, gave the results of a study of

"THE GENERAL AFTER EFFECTS OF ETHER."

The following observations were made on the operative cases of the III Surgical Service of the Boston City Hospital during the months of December, January and February past. The objects were to ascertain more definitely the presence of minor undesirable after effects in the Hospital patient.

The conditions investigated were:

1. Vomiting
2. Nausea
3. Headache
4. Cough.

In 94 cases notes on all of these conditions were obtained—in 158 notes on vomiting alone.

The cases were roughly $\frac{2}{3}$ male, $\frac{1}{3}$ female. They were taken as they came to operation, without regard to condition or to the character of the operation. In 5 cases ether was administered immediately after entrance,—these were emergency cases and had eaten a full meal within 3 hours.—The other cases received the usual Hospital breakfast 1 pint of beef tea,—given at 7 A. M. The operation took place usually between the hours of 10 and 12 A. M.—and as a rule nearer the latter than the former limit. Reports upon the vomiting were obtained from the etherizer, and from the nurse to whose care the case was resigned by the etherizer. The nature of the operation varied from opening an abscess to laparotomy and trephining,—the duration of the ether from primary anaesthesia of a few moments, to profound anaesthesia of two hours.

Of 158 cases in which the vomiting alone was investigated—in 53 it was present, about 33 per cent. In these cases it could not be demonstrated that any constant relation existed between the character of the operation, or the duration of the anaesthesia and the vomiting. More than once it happened that patients in excellent general condition vomited more profusely after a short, simple operation than others who were on the table for more than an hour. I have since noticed the same peculiarity in out-patient cases who walk into the Hospital and go home after the operation.

In regard to the severity of vomiting,—it was present in moderate degree in a large majority of cases; in these cases the patient vomited only once or twice, and at times the vomitus consisted only of mucus. It might be said that vomiting was considered present if there were spasmodic contractions of the diaphragm or if only a small quantity of mucus was discharged from the mouth. In about 15 per cent. of cases the vomiting was severe, but in none dangerous.

How or why ether produces vomiting has not, I believe, been definitely shown. In a general way it is supposed to be in proportion to the amount of ether administered. It must also depend, to a certain degree, upon the constitutional peculiarities of the patient. The age of the patient apparently has no influence. It has seemed to the writer that vomiting is present to a considerably greater extent in private than in Hospital patients, and apparently it is certain that the more skilful the etherizer, the less and less frequent will be the vomiting. This may depend upon the care with which the ether is administered and the fact that the patient has just enough ether to maintain unconsciousness and no more—and to attain this end it is absolutely essential that the etherizer shall not devote any of his attention to the operation.

In 94 patients the condition of nausea was investigated. It was present in 38. To these patients the

direct question of its presence was asked,—and care was taken to make them understand that nausea meant more than a sensation in the stomach which immediately preceded, or accompanied the vomiting. The nausea was usually moderate in amount and as a rule did not cause great discomfort. In a few cases however, the nausea was excessive and continued for hours ; in 2 or more cases through the night and into the following day, and as a rule the cases in which the nausea was most severe, were not the cases in which the vomiting was excessive. Nausea was found to be present in cases in which there was no vomiting at all, and absent in cases in which vomiting was severe. It was present in about 40 per cent of all cases, or rather more frequently than vomiting.

The presence of headache was also made the object of direct questioning in 94 cases, and was present in 36 cases. In many of these it was extremely slight, and would never have been elicited except by leading questions. It was almost invariably frontal,—sometimes extending to the vertex, but very rarely to the occipital region. In two cases it was unilateral. It did not bear a constant relation either to the vomiting or the nausea. Its duration was in the majority of cases, from 2 to 6 hours. In a small proportion of cases it continued throughout the night. Whether it bore a constant relation to the conjunctivities which often

follows etherization, was not investigated. It was a
distinctly less prominent symptom for the patient than
either nausea or vomiting. In a few cases dizziness
and a feeling of pressure throughout the head, were
present instead of headache,—but have been classed
here with the headache; in two cases the dizziness
was very severe whenever the patient lifted the head
from the pillow.

Cough was investigated in 94 cases; was present in
20 cases, and severe in 3. In these three there were
moist rales in the lungs, particularly in the backs and
bases of both sides, without dullness, and lasting from
24 to 48 hours; two of these patients complained of
soreness in the chest. The others as a rule did not
complain of cough until asked about it. It continued
from 3 to 6 hours as a rule, and could not be found to
bear any constant relation to the other symptoms
above noted. The so-called ether bronchitis was
certainly not present in more than 3 cases, and it was
noted that those patients in whom mucous and froth
were present in mouth and throat in large quantities
during etherization, were not the cases in which cough
was most annoying. As a rule there was but little
expectoration, and often none at all. When present
it was thin, white and mucoid, and probably originated
in the throat and back of the mouth, where ether
always causes irritation. It is possible that if ether
is pushed in the beginning of the etherization, the
development of this cough is favored.

It is interesting to notice that of 94 cases carefully examined, only 20 were free from all unpleasant after symptoms. If this is true in this class of patients, who are as a rule strong, healthy, and not given to exaggerating symptoms, it is more apt to be true of private cases, who are more easily influenced by irritants of any sort, who suffer pain more acutely, and usually look forward to an operation with considerable apprehension. This has seemed to the writer to be the case although statistics are not at hand to prove it.

The etiology of the cough, and the rarer cases of bronchitis is probably that of simple irritation of throat or lungs. The headache may be due to the congestion which is known to occur during anaesthesia, but why the pain should be so frequently frontal only, is not explained.

The writer has been unable to find any satisfactory theory to explain why vomiting and nausea occur after ether. Reflex irritation, or irritation of the vomiting centre are certainly sufficiently vague. Vomiting may be caused by so many and so different agents, that it is difficult to offer an explanation which will cover all conditions. Vomiting may be produced through irritation of almost all the special senses,—as well as through direct irritation of the stomach itself, internally or externally. Certain drugs, and particularly the sulphate of atropine in

1-60 grain doses, certainly tend to diminish the vomiting, as well as the excessive secretion of mucus. Absence of food before and plenty of air during etherization also tend to minimize it. But how to eradicate is not evident.

Dr. J. B. Ogden read on the

"EFFECTS OF ETHER ON THE KIDNEYS"—A STUDY OF 75 CASES.

(From the Clinical Laboratory of the Boston City Hospital.)

In 1895 a series of obervations was undertaken in order to determine, if possible, the actual effect of the elimination of ether on the Kidneys.

The work was carried on with the co-operation of Dr. Abner Post, from whose service (surgical) selected cases were taken for observation.

The success of the work was obviously dependent on a very careful examination of the urine before ether and then a similar examination after the ether had been given.

The urinary examination in each case was as follows: Color—Reaction—Specific Gravity—Tests for Albumin and Sugar—Microscopical examination of the Sediment. The test for Albumin was made by first filtering the urine in order to remove any and all suspended matter, the urine was then placed in a wine glass and colorless nitric acid allowed to flow down the

side of the tilted glass, using about $\frac{1}{3}$ as much acid
as urine.   This preparation was then placed on a table
in good light (avoiding direct sunlight) and a dark
cloth adjusted obliquely at the side and slightly in front
of the wine glass.   If the slightest cloud or haze could
then be seen just above the junction of the acid and
urine it was designated as the Slightest Possible Trace
of Albumin.   If, still using the dark background, the
cloud was found to be somewhat more distinct it was
termed a Very Slight Trace.

The Fehlings test for Sugar was used in every in-
stance.

The urinary sediment was carefully examined for
formed elements, especially for casts and blood glob-
ules, and was always given the same attention whether
Albumin was present in the urine or not.

If the urine was free from Albumin, the sediment
was invariably found to be free from casts or blood
globules.

An effort was made in the selection of the cases to
take only those having little or no renal disturbance be-
fore administering the ether.   Urines containing more
than a small amount of pus and blood were eliminated.

The cases studied were, for the most part, those re-
quiring a minor operation and consequently a very
small loss of blood, so that we can practically exclude
the effect of Acute Anaemia as regards any renal dis-
turbances.

The total number of cases studied was 75.

ALBUMIN.—In 34.6 per cent. of these cases albumin was not found before but was found after the ether.

In 34.6 per cent., albumin was found before, and was increased after, the ether.

The total percentage of cases then, showing albumin, or an increase in the albumin after ether was 69.2 per cent.

In 26.6 per cent. of the cases there was no increase in the quantity of albumin after the ether.

In 1.54 per cent., albumin was not found before or after ether.

In 1.33 per cent., albumin was found before but was considerably less after the ether.

In 1.33 per cent., albumin was found before, but was absent after ether. In these last two instances a few blood globules were accountable for the variation in the quantities of albumin, as casts were not found in either case.

As we well know, albumin may be present in the urine without the presence of renal elements; in other words, without any renal disturbance or disease. It is therefore necessary for us to consider the presence or absence of renal casts, in order to judge of the presence, and to a large extent, the degree of renal disturbance.

CASTS—In 14.6 per cent. of the cases, renal casts were found in the sediment before ether, and were in-

creased in number after the ether. In 57.3 per cent. casts could not be found before, but were present after.

This makes a total of 71.9 per cent. of the cases in which there was a renal disturbance or an increased renal disturbance as shown by the number of casts.

(*) In 22.6 per cent. casts were found before, and no change in the relative proportion after ether.

In 5.3 per cent. casts could not be found either before or after the ether.

It seems that 22.6 per cent. of the cases passed a more concentrated urine after the ether than before, and this brings up two important points to be considered.—

1st. Whether or not a part of the renal disturbance may not have been due to the elimination of a more concentrated urine after than before the ether ?

An analysis of the cases under consideration shows that only about 10 per cent. passed a urine which was highly concentrated after the ether, the remainder (12.6 per cent.) passing only a slightly concentrated urine.

There is very little doubt but that a highly concentrated urine may set up an active hyperaemia of the kidneys. In the light of this, it will be necessary to deduct this 10 per cent. from the 71.9 per cent. of cases (see above) making a total of 61.9 per cent. of all cases in which the kidneys were affected, apparently, by the ether.

2nd. Because of this concentrated condition of the urine, whether or not there may not have been a relative increase in the quantity of albumin or the number of casts?

This can be given a negative answer, for it was found that in this 22.6 per cent. of the cases, such a relative increase in the albumin and casts did not exist (compare above *).

The quantity of ether given these cases varied from 100 to 80ᴜ c. c. and the length of time under the influence of the ether from 10 minutes to $1\frac{1}{2}$ hours.

There seemed to be no relation whatever between the amount of ether given, and the length of time that the patient was under its influence and the severity of the renal disturbance, for there were generally as many casts after a small operation and a small quantity of ether, as after a larger operation and a larger amount of ether.

As a rule the length of time that casts were found in the urine after ether, when they were not present before, varied from 3 to 10 days.

Some of the cases could not be watched for a longer period than this, so that this data is far from being complete. Sugar was found in the urine of only one of the 75 cases after ether, there being none before. Although the amount of sugar was too slight to quantitate, it was eliminated in traces for 3 days, then entirely disappeared. So far as I was able to judge the

quantity of albumin and number of casts was not af-
fected by the sugar, as both albumin and casts contin-
ued some days after the sugar had disappeared.

The urines of children after ether did not show evi-
dence of any more marked renal disturbance than those
of adults.

Dr. M. W. Richardson read, by title, a paper

"ON THE BACTERIOLOGICAL EXAMINATION OF THE STOOLS IN TYPHOID FEVER, AND ITS VALUE IN DIAGNOSIS."

(From the Laboratory of the Mass. General Hospital.)

In investigating stools for the typhoid bacillus the
greatest difficulties have arisen from the other bacteria
present. These have been a disturbing element, first,
because their colonies often resemble markedly those
of typhoid, and secondly, because, in their growth,
they often completely liquefy the gelatin before the
typhoid colonies have a chance to grow. This latter
difficulty can, to be sure, be obviated by the use of
agar, but even then the colonies lack a characteristic
appearance, and many have to be picked up and veri-
fied, in the hope that one or more will prove to be
typhoid.

The potato gelatin of Holz partially remedied these
difficulties. This medium, by its acidity, prevented
the growth of a number of the disturbing bacteria,

and this inhibitory power was still further increased by the addition of .03 per cent. of carbolic acid. Upon this medium both typhoid and colon bacilli grew, but the typhoid colonies were said to be perfectly characteristic, small, pale, oval, and translucent.

Elsner (Zeit. für Hygiene, 1895, XXI. p. 25) made use of the potato gelatin of Holz, but substituted for the carbolic acid the iodide of potash in the strength of 1 per cent. This method has been used by a number of observers with very considerable success. It has not been at all uncommon to find the organisms as early as the 7th. day of the disease, and, though, with convalesence, the bacilli disappear rapidly from the stools, still they have been found as late as the 36th. and 41st. day after the temp. had reached the normal point.

Indeed the method has been more than successful, for Remlinger and Schneider claim to have found typhoid bacilli in the stools of 5 out of 10 non-typhoidal patients,—a leukaemia with fever, an acute dysentery, a case of acute miliary tuberculosis, and 2 chronic malarias. These latter results, are of course, very remarkable, but I think they must be accepted with great reserve until confirmed by other observers.

My own investigations had the following objects in view.

I.—To test the Elsner method as such.

II.—To compare it with the newly-discovered se-
rum-reaction ; to see whether there might not be cases
where no serum test was to be obtained, but where
bacilli were to be recovered from the stools.

III.—I desired to determine the accuracy of the
assertions of Remlinger and Schneider as to the
ubiquity of the typhoid bacillus.

The latter part of the work was done by aid of a
new agar medium as recommended by Capaldi. (Zeit.
für Hygiene, Bd. XXIII. Th. III.) This medium is
easier to make up than the Elsner gelatin, and my
results with it have been at least as good as, if not
superior to those with potato gelatin. Its advantages
are—

I.—No chance for liquefaction.

II.—The typhoid colonies are much larger, and
thus more easy to pick up. With the gelatin the colo-
nies were often so small that it was impossible to
make inoculations from them.

III.—Colonies are ready for examination in 18°
rather than in 48° or 72°.

The only disadvantage is that the colonies are not
quite so characteristic as upon the gelatin.

Everything considered, however, the Capaldi agar
has been quite satisfactory. The only difference in
procedure is that with the agar, the plates are first
poured and hardened. The suspected material is
then spread upon the surface, whereas, with the gel-

atin, the material is thoroughly mixed with the medium while the latter is melted.

Although the two methods were used in my investigations, the results, for the sake of simplicity, will be considered together.

In all there were examined 100 stools in 49 different individuals. Of these 49 cases 13 were typical typhoids in the febrile stage, and in these 13 cases 55 stools were examined.

The isolation of the typhoid bacillus was accomplished in 10 out of 13 febrile cases in 19 out of 55 stools. In one case the bacilli were found on what was said to be the 5th. day of the disease, but the history was somewhat indefinite, and the disease was probably farther advanced. Two cases were positive on the 11th day. In the other 7 cases the typhoid organisms were discovered first on the 12th., 20th., 23rd., 27th., 28th., 29th , and 36th. day respectively.

Seven out of 10 cases were positive upon the first examination. In these cases, therefore, it is impossible to say how much sooner the organisms might have been found had the stools been received earlier. In the three other positive febrile cases the bacilli were isolated only after several examinations on the 20th., 27th., and 28th., days. In testing the cultures obtained from these positive cases the bacilli were examined :—

I. As to their size, shape, and motility.

II. Growth in gelatin stab and slant.

III. Litmus milk.

IV. Sugar agar.

V. Peptone sol. for indol.

VI Potato.

VII. Bouillon.

VIII. Two new test solutions of Capaldi.

IX. Reaction to typhoid serum.

Of the three negative cases one was unsatisfactory because the stools could be examined but once, and that on the 6th. day of the disease. The other two negative cases were typical typhoids, and one went through a relapse as well. Athough six stools in one case and eight in the other were searched, and that, too, by both methods, Elsner and Capaldi, I was never able to isolate the typhoid bacillus.

All these 13 cases gave well-marked serum-reactions at least two days before the organisms could be recovered from the stools. We see, therefore, that, as far as this series of cases goes, the serum reaction proved itself much superior as a diagnostic aid.

There are cases reported, however, such as those of Biggs and Park, Breuer, Achard, Cahill, and Thoinot, where the serum reaction did not come either until late in the disease, till convalesence began, or perhaps till the occurrence of a relapse. In such cases it would seem as if a bacteriological examination of the stools would be of great value, for

the appearance of the bacilli in the dejections of the second week is a quite common occurence. In fact Kolle has reported two such cases where the serum reaction was obtained first on the 16th. and 17th. days, but where the bacilli were cultivated from the stools on the 10th. and 11th. day.

To continue with my own cases — 2 stools in 2 cases of doubtful typhoid were examined with negative result. These 2 cases never presented any serum reaction, and were practically convalescent when investigated.

Twenty-three stools of thirteen convalescent typhoids were examined, with but one positive result, and that on the first day after the fever had disappeared. In one case of this series the search was kept up until the 24th. day of convalescence, but the results were all negative.

Seventeen stools of seventeen non-typhoidal cases were also all negative. Included in this series were cases of grippe, pneumonia, sepsis, meningitis, otitis-media, endocarditis, gonorrhœal rheumatism, and neurasthenia.

Furthermore, the intestinal contents from the autopsies of 12 individuals were also examined, with the object that, in case of a positive result there might be no doubt as to the diagnosis. The diseases represented in these autopsies were all entirely non-typhoidal in character, and the results absolutely negative.

CONCLUSIONS :

I.   The isolation of typhoid bacilli from the dejec-
tions of persons sick with typhoid fever is, in the great
majority of cases, a practicable procedure.

II.   With the appearance of convalescence the
organisms disappear rapidly from the stools.   They
may persist, however, several weeks.   This fact is
important as regards disinfection.

III.   The value of the serum test in diagnosis is
greater, in most cases, by reason of its earlier appear-
ance, and the ease with which it can be carried out.
In those cases, however, where the specific blood
changes necessary for the serum reaction do not appear
till late in the disease — convalescence, or relapse —
in such instances the bacteriological examination of
the stools would be of great value.

IV.   The results of Remlinger and Schneider who
declare the typhoid organism to be ubiquitous, could
not be confirmed by the writer.

Mr. F. H. PRATT made some remarks on

" THE CIRCULATION THROUGH THE VEINS OF

THEBESIUS."

Various experimenters in cardiac physiology have
had occasion within recent years to maintain an
artificial circulation through the coronary arteries.
Under these conditions, it was frequently noticed
that the circulation fluid not only escaped through the

coronary veins into the right side of the heart, but also found its way in small quantities into the left side, where it was found, ordinarily, collected in the left ventricle. Since, in these cases, the heart was so isolated as to eliminate entirely any connection with the lungs, the only channel of intercommunication left open was through the veins of Thebesius. These are minute vessels, first discovered by Thebesius early in the last century, which open through small foramina in the endocardial surfaces of the mammalian heart.

All opinions heretofore held regarding the physiology of these vessels seems to rest upon the assumption that they serve the purpose of conveying venous blood from the walls into the cavities of the heart. So far as I have been able to learn, no experimental physiological work has ever been done on the veins of Thebesius.

The objects of the present research have been— first, to determine what portion of the coronary blood flows from the left side of an isolated heart; second, to trace the anatomical connection of the veins of Thebesius with the coronary vessels; third, to establish the function of the former by experiments upon the living heart.

To determine the relative amounts of flow from the right and left sides of the heart, injections of defibrinated blood were made into a coronary branch of the

extirpated heart of a mammal, and the outflows from
both ventricles measured. This was accomplished
by tying of all venous inlets, and inserting canulas—
one in the pulmonary artery, another in the left ven-
tricle through the left auricular appendix. In this
way, quantitative results, not yet complete enough
for publication, were obtained.

At this point in the investigation, it occurred to me
that these "veins" of Thebesius might possibly per-
form the function of arteries, as many of them are
situated in the distributing, and not in the receiving
chambers of the heart. The plausibility of this was
strengthened by the analogy between these vessels and
the fine passages found in the heart of the frog, which
serve the purpose of nourishing the walls with blood
direct from the ventricles.

On the basis of this hypothesis, experiments were
now carried on from both an anatomical and a physi-
ological standpoint. Injection masses of starch and
celloidin failed to pass from the coronary arteries of
the dog and ox into the heart cavities. Similar
injections into the coronary veins, however, were suc-
cessful. The passing of such thick masses indicates
a close connection between the vessels of Thebesius
and the coronary veins.

It now remained to determine whether or not an
isolated heart may be maintained in rhythmic con-
traction through nutrition from the endocardial walls

alone. A series of experiments according to the following methods was now begun, mainly with the freshly excised heart of the thoroughly etherized cat. Blood from a carotid artery is defibrinated, and the heart excised. The auricles are tied off from the ventricles, and both coronary arteries ligated. A large canula is introduced into the right ventricle through the pulmonary artery and secured by a ligature. This canula is now supported vertically, so that the heart shall hang from its lower end, and defibrinated blood poured in from the top so as to fill the ventricle and rise in the canula to a height of several inches.

The ventricle is distended, and all the coronary veins become filled with blood; the coronary arteries remain empty. The ventricle begins to contract rhythmically—slowly at first, but gradually attaining the normal rate. Suspending the heart in warm normal saline solution facilitates the action. The blood within the ventricle and in the veins becomes venous, and, if contractions are to be sustained, must periodically be renewed. If a vein is opened, a small but steady outflow of blood occurs. Increasing the load beyond that furnished by a blood column of four or five inches lowers the force of contraction. Contractions may be kept up by this method for several hours. Ringer's solution substituted for blood has failed to sustain contractions. Similar results have

been obtained with the left ventricle, though not so
marked. It is to be noted that, so far as observed,
contraction occurs in that ventricle *alone* into which
blood has been introduced. When both are supplied,
both contract, and simultaneously. Never in the
course of an experiment have the coronary arteries
been observed to fill with blood.

The results of these experiments furnish conclusive
evidence of genuine nutrition. The blood becomes
venous, and must be renewed in order to sustain con-
traction. That the contractions are not due to mere
mechanical stimulus is proved by the fact that Rin-
ger's solution fails to carry on the process. A gen-
uine circulation may exist between the ventricular
cavity and the veins, as shown by the constant out-
flow following the opening of a vein. This outflow,
however, does not appear to be, so far as nutrition
is concerned, a necessary condition, since reduced
blood finds its way back to the ventricle in any
case,—probably by the same channels through which
it enters the cardiac tissue. The relation of the cir-
culation in the veins of Thebesius to the beat of the
heart, and the exact nature of this circulation in life
are points not yet determined.

An important bearing of these experiments lies in
the possible application of the results in pathology.
The possibility of a direct nutrition from the ventricles
may serve to explain many cases where a gradual

stoppage of the coronary arteries has failed to destroy life. It does not seem unreasonable to suppose that during the gradual withdrawal of nutriment from the heart-walls, the vessels of Thebesius have assumed an important function in allowing of sufficient infiltration of blood to prevent the process of infarction.

With a view to settling definitely the anatomical connections of the veins of Thebesius, corrosion preparations are now in process of digestion.

The question as to whether or not these vessels are really homologous with the structures found in the batrachian heart can doubtless be settled by a comparative study of the animal series. This problem may well be made the subject of a separate investigation.

Dr. J. L. Goodale presented, by title,

" AN ETIOLOGICAL STUDY OF ATROPHIC DISEASE OF THE UPPER AIR PASSAGES."

In order to submit the current opinions regarding the predisposing causes of atrophic states of the upper air passages to the test of a systematic examination, the writer investigated 200 cases exhibiting such conditions. There were excluded from consideration the following nutritive abnormalities :

I. The hypoplasia of the turbinates occurring in chlorotic females ;

II. The undeveloped condition of the nasal structures found in children with post-nasal obstructions ;

III. Anaemic conditions occurring in general malnutrition ;

IV. Pressure-atrophies from septal deviations and tumors. Syphilitic disease was also excluded.

The cases of genuine atrophy were divided into :

I. Non-fetid atrophy ; i. e., atrophic states of the nasal structures, not accompanied by fetor, whether or not involving also the pharynx and larynx ;

II. Fetid atrophy of the nasal structures, whether or not involving the pharynx and larynx ;

III. Atrophic states of the pharyngeal mucous membranes, not accompanied by atrophy of the nasal structures.

The etiological relation of these states was examined with reference to age, sex, sexual functions in the female, general nutrition, abnormal potency of the anterior noses, associated hypertroptic conditions of the mucous membrane and of the lymphoid structures.

A brief summary of the results of this investigation makes evident the following facts :

Both fetid and non-fetid atrophy occurred from two to three times more frequently in females than in males, while the pure pharyngeal atrophy occurred with nearly equal frequency in both sexes.

The first two forms began generally between the ages of 5 and 15, while the pharyngeal form was not found before 20.

While menstrual anomalies are not strikingly fre-

quent, 4 per cent. non-fetid and 26 per cent. fetid cases experienced marked aggravation of the condition during menstruation.

Three-fourths of all cases showed good health and nutrition.

Abnormal patency of the anterior nares was found in 40 per cent. non-fetid, 60 per cent. fetid cases, and 10 per cent. of the pharyngeal form.

Distinct hypertrophy of the adjacent mucous membrane occurred only in isolated instances among the fetid and non-fetid nasal forms, while in the pharyngeal type, hypertrophy of the nasal mucous membrane was present in nearly half the cases.

Adenoid enlargements occurred in 20 per cent. of the non-fetid, in 7 per cent. of the fetid, and in 10 per cent. of the pharyngeal atrophies.

Tonsillar hypertrophy occurred in about 20 per cent. of each of the three forms.

The weight of these facts is distinctly against the theory that non-fetid and fetid atrophy is the sequel to a pre-existing hypertrophy. On the other hand, they are in direct corroboration of the supposition that these two conditions are primarily atrophic processes, whether or not we consider them to originate in the action of a specific micro-organism.

The conditions present in the form of pharyngeal atrophy are more complex and not productive at present of inference as regards etiology.